AD-A190 372 METHOD OF MANUFACTURING POLYAMIDE POLYURETHANE AND SIMILAR THREADS FIBERS (U) FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH W KUENTSCHER ET AL. 10 FEB 88 FTD-ID(RS)T-0851-88 F/G 11/9 NL

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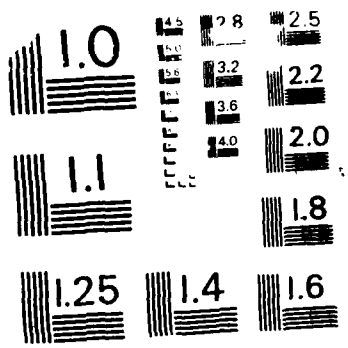

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FOREIGN TECHNOLOGY DIVISION

METHOD OF MANUFACTURING POLYAMIDE, POLYURETHANE AND SIMILAR THREADS, FIBERS, TAPES AND OTHER ARTICLES AND DEVICE FOR CARRYING OUT THIS METHOD

by

W. Küntscher, H. Kilger, V. Davydov

HUMAN TRANSLATION

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By: W. Küntscher, H. Klinger, V. Davydov

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Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

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METHOD OF MANUFACTURING POLYAMIDE, POLYURETHANE AND SIMILAR THREADS, FIBERS, TAPES AND OTHER ARTICLES AND DEVICE FOR CARRYING OUT THIS METHOD

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(Germany)

Claim of 6 February 1949 No. 385190 made to Gostechnik USSR
Published on 28 February 1951

This invention is a method of manufacturing polyamide, polyurethane, and similar threads, fibers, tapes and other articles by molding them from a polymer melt.

The advantage of the proposed method over the known one is that the threads, fibers, tapes and similar articles obtained from polyamides, polyurethanes and similar substances are of higher quality, specifically, with regard to their strength and elongation. This is accomplished by using an electromagnetic field during the processes

of molding the article, feeding the molten polymer to the nozzle, cooling and hardening the article, or extending and applying other treatments to threads, fibers, tapes, etc. In order to do this, a device constructed in the form of a series of electrical coils through which the article to be molded is passed in the direction of the coils' longitudinal axis is used. The electromagnetic field can be excited by direct or alternating current.

According to the invention, polyamide, polyurethane and similar fibers, threads, tapes and other articles are manufactured in the device diagrammed in the figure.

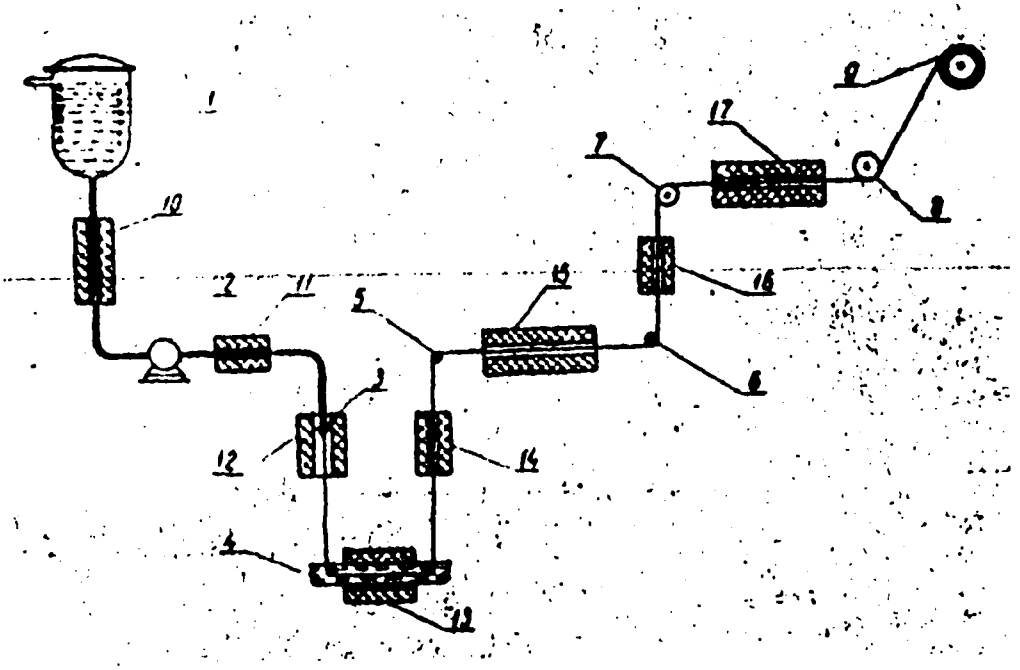

Figure.

The molten artificial substance goes from storage container 1 to gear pump 1, which forces it through nozzle 3 under pressure of 4-6 atm. The thread obtained here is passed through cooling bath 4 and an extension mechanism which consists of a series of rollers 5, 6, 7, 8, etc., and then it is wound onto drum 9. The peripheral velocity of the rollers is gradually increased in the direction of movement of the threads, causing the thread to be stretched and elongated accordingly.

The electric coils 10-17 can be placed at different points of the device, shown in the diagram. A different effect can be achieved by connecting all of the coils or only some of them, as desired.

The strength of the force field, i.e., the number of turns and the electrical load of one coil, must be selected for each individual case. In general, a field strength of 300-1000 oersteds proves to be sufficient. Here the frequency must reach roughly 50 cycles, if possible.

Sometimes it is advantageous to use several coils placed one after another instead of one coil. Moreover, according to the invention, the simultaneous action of different and isolated force fields for two or more particular processes is possible when molding the article.

The use of electromagnetic force fields for forming threads, fibers, tapes or brushes considerably improves the quality of the

article and increases its strength and elongation at rupture. Fabrics manufactured from fibers processed in this manner are much stronger.

Example 1. A high-polymer block which is made into tape by melting it and passing it through a nozzle 1 mm wide and 6 mm long is obtained from aminocaproic acid lactam by heating. After cooling, the tape obtained is passed through a vertically arranged coil over which alternating current of 50 cycles flows, and a force field of 320 oersteds is then generated. One end of the tape is clamped down, while a gradually increasing load is applied to the other end. When the tape tears, the load and extension are measured.

The results of the tests are given below:

	Load at rupture, kg/mm^2	Load at rupture, %
Without effect of electromagnetic field	1.7	177
	1.9	242
	1.8	205
With effect of electromagnetic field	2.3	537
	2.0	562
	2.4	412

The values of the load at rupture refer to 1 mm^2 of the initial transverse cross section of the tape.

Subject of Invention

1. A method of manufacturing polyamide, polyurethane and similar threads, fibers, tapes and other articles by molding them from a polymer melt. **It is different** because an electromagnetic field is applied to the article while it is being molded, when the molten polymer is fed to the nozzle, when the article is being cooled and hardened, or during drawing and other processes used on the threads, fibers, tapes, etc.

2. A device for carrying out the method described in §1 **which is different** because it is made in the form of a series of electrical coils through which the article being molded is passed in the direction of their longitudinal axis.

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